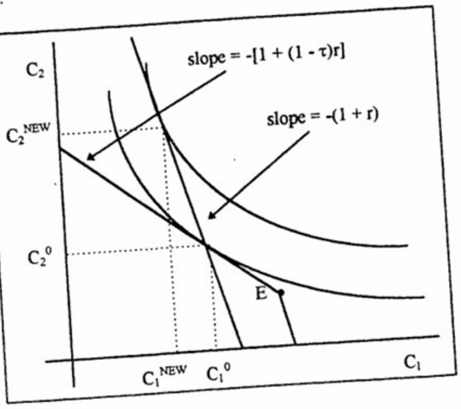
Problem 7.5

(a) The present value of the lump-sum taxes is $T_1 + [T_2/(1 + r)]$. The present value of the tax on interest income is $[r/(1 + r)]\tau(Y_1 - C_1^0)$, where τ is the tax rate on interest income. The government must choose T_1 and T_2 so that these two quantities are equal, or

$$(1)\quad T_1 + \frac{T_2}{1+r} = \frac{r}{1+r}\tau(Y_1 - C_1^0).$$

(b) Suppose the new taxes satisfy condition (1). This means that at the point where the individual consumes C_1^0, she pays the same with the new lump-sum tax as she did with the old tax on interest income. That is, right at C_1^0, the individual's after-tax lifetime income is the same under both tax schemes. Thus at C_1^0, the individual has just enough to consume C_2^0 in the second period under both tax schemes. This means that the new budget line must go through (C_1^0, C_2^0) just as the old one did. Since (C_1^0, C_2^0) lies right on the new budget line, it is just affordable.

(c) First-period consumption must fall. Consider the figure at right. Point E represents the endowment, (Y_1, Y_2). The budget line under the tax on interest income has slope $-[1 + (1 - \tau)r]$ for $C_1 < Y_1$; for $C_1 > Y_1$ there is no positive saving and therefore no tax on interest income so that the slope equals $-(1 + r)$.



As explained in part (b), the budget line with revenue-neutral, lump-sum taxes goes through the initial optimum consumption bundle, (C_1^0, C_2^0). It has slope equal to $-(1 + r)$. With saving no longer taxed, then for any $C_1 < Y_1$, giving up one unit of period-one consumption yields more units